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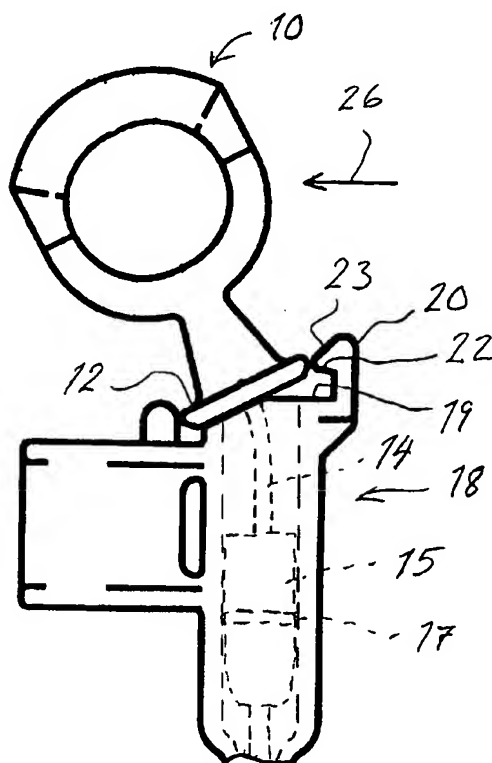
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(54) Title: PLUG MEANS



(57) Abstract: The invention relates to a plug means (10, 18) for lockable sealing of a passage opening with a support surface (19) intended for positioning the plug means. Simple lockability and demountability are brought about by virtue of the plug means comprising a sealing plug (15) for interaction with the sides of the passage opening, a retaining means (129, connected to the sealing plug, for interaction with a hook means (20) connected to the passage, and a flexible resilient connecting element (149) between the sealing plug and the retaining means.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Plug means

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TECHNICAL FIELD

The present invention relates to a plug means for lockable sealing of a passage opening, with a support surface intended for positioning the plug means.

10

BACKGROUND

Today's environmental requirements relating to internal combustion engines mean that the crankcase ventilation of the engine has to pass through oil-separation arrangements intended for the purpose. Moreover, the
15 crankcase is to be designed so that the risk of leakage to the environment is minimal.

There are also fire safety requirements for flammable
20 liquids such as engine oil not to be spread from a vehicle, even in the event of engine trouble. In the event of engine seizure, for example, great overpressures can arise inside the crankcase. It should not be possible for such an overpressure to lead to,
25 for example, a dipstick arranged in the crankcase to be pressed out of its normal mounting position. Although the oil level in an internal combustion engine can be monitored electronically, it is advantageous to be able to inspect the condition of the oil visually.

30

It is known to provide dipsticks with locking means, for example a bayonet mount or the like, which makes it possible to rotate the dipstick into a locking position. There is always a risk, however, that locking

will not be effected correctly, the sealing function then being lost. It is therefore desirable for a plug means to be easy to handle for the operator, so that it can be guided into and out of its locking position
5 without difficulty.

DISCLOSURE OF THE INVENTION

One object of the invention is therefore to produce a lockable plug means which is easy to demount and to fit
10 in a locked position of use.

To this end, the plug means according to the invention is characterized by a sealing plug for interaction with the sides of the passage opening, a retaining means,
15 connected to the sealing plug, for interaction with a hook means connected to the passage, and a flexible resilient connecting element between the sealing plug and the retaining means. By virtue of this design of the plug means, the retaining means can easily be guided
20 into or out of its retaining position counter to the action of the flexible resilient connecting element.

Further advantageous illustrative embodiments of the invention emerge from the subclaims which follow.

25

BRIEF DESCRIPTION OF FIGURES

The invention is described in greater detail below, with reference to illustrative embodiments shown in the accompanying drawings, in which

30 FIG. 1 is a partial side view of a dipstick forming part of the plug means according to the invention,

FIG. 2 shows a partial side view of a mounting for the dipstick shown in Fig. 1,

FIG. 3 is a partial side view of the dipstick according to Fig. 1, mounted in the mounting according to Fig. 2, in a normal position of use, and

5 FIG. 4 shows the components in Fig. 3 in a position in which the dipstick is about to be drawn out of the mounting.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

The illustrative embodiment shown in the figures relates to a plug means in the form of a dipstick, but the
10 invention can also be applied to other types of plug means.

Fig. 1 shows the upper part of a dipstick 10 which
15 comprises a ring-shaped handle 11 which merges in its lower part with a flange-shaped retaining means 12 which is oriented transversely to the longitudinal axis 13 of the dipstick. The handle 11 is connected in a tensionproof manner to a flexible resilient steel cable
20 14 which is connected at its free end (not shown) to a measuring stick for measuring the oil level, for example in the crankcase of an internal combustion engine.

A cylindrical sealing plug 15 is mounted coaxially on
25 the cable 14 at a given suitable distance from the retaining means 12. The sealing plug has a diameter which is adapted to the diameter of the opening to be sealed, and is conically chamfered at the end so as to facilitate introduction into such an opening. The
30 sealing plug is also provided with a peripheral groove 16 which accommodates an O-ring 17 made of rubber.

Fig. 2 shows an elongate tubular support 18 which is intended to be mounted upright in a crankcase, so that

it forms a passage from the outside into the crankcase. This passage then forms a guide for the dipstick 10 so that its end is directed down into an oil sump belonging to the crankcase.

5

The tubular support 18 is provided with a support surface 19 which defines the end point of the insertion of the dipstick into the support. A hook means 20 is arranged at one side of the support surface of the
10 tubular support 18 in such a manner that the flange portion 12 of the handle 11 can pass the hook means. This position is shown in Fig. 3 and means that the dipstick is secured in this position by a retaining surface 22 which extends transversely to the
15 longitudinal axis 21 of the support 18, faces the opening of the support and is arranged so as to act against the upper side of the flange 12 of the handle 11. Introduction of the dipstick into this position is facilitated by virtue of the hook means being provided
20 with a chamfered sliding surface 23. The flange portion 12 of the handle is also provided with a chamfered sliding surface 24, directed downwardly in the figures. The sliding surfaces 23, 24 are suitably chamfered at an angle of roughly 45°, but other angles are also
25 possible.

The flexible resilient portion of the cable 14 between the flange 12 and the plug 15 makes it possible for the handle to be displaced slightly in the lateral direction
30 in relation to the longitudinal axis 21 of the tubular support. By virtue of this, the dipstick can be fitted in its locking position without any appreciable resistance or difficulty. The locking is sufficiently

strong to secure the dipstick safely even if a high overpressure arises momentarily in the crankcase.

Fig. 4 shows how the dipstick 10 can easily be freed from the locking position. This is made possible by virtue of the support surface 19 having a chamfering 25 on the diametrically opposite side of the opening of the tubular support in relation to the hook means 20. It is therefore possible to angle the handle, as Fig. 4 shows, in the direction of the arrow 26, the flange portion 12 then moving in the lateral direction until the flange edge can pass the tip of the hook means 20. A certain lateral force on the handle 11, in order to free the dipstick from the locking position, and also a tensile force are therefore required, which prevents the dipstick being freed from its locking position unintentionally.

The invention is not to be considered as being limited to the illustrative embodiments described above, but a number of other variants and modifications are possible within the scope of the patent claims below. For example, the connecting element does not have to be a steel cable, but can be replaced by, for example, a suitable plastic material.

PATENT CLAIMS

1. A plug means (10, 18) for lockable sealing of a
5 passage opening with a support surface (19) intended for
positioning the plug means, characterized in a sealing
plug (15) for interaction with the sides of the passage
opening, a retaining means (12) connected to the sealing
10 plug for interaction with a hook means (20) which is
connected to the passage, and a flexible resilient
connecting element (14) between the sealing plug and the
retaining means.

2. The plug means as claimed in claim 1, characterized
15 in that the hook means (20) comprises a retaining
surface (22) projecting essentially transversely to the
longitudinal axis (21) of the passage opening and facing
said opening.

20 3. The plug means as claimed in claim 2, characterized
in that the hook means (20) is provided with a sliding
surface (23) chamfered essentially transversely to the
center axis (21) of the passage opening and facing in
the opposite direction.

25 4. The plug means as claimed in claim 3, characterized
in that the sliding surface (23) has an angle of chamfer
of roughly 30 to 60°, suitably roughly 45°.

30

5. The plug means as claimed in any one of claims 1 to 4, characterized in that the hook means (20) is located at one side of the passage opening, and in that the support surface (19) is provided with an oblique chamfer (25) on the diametrically opposite side of the passage opening.

6. The plug means as claimed in any one of claims 1 to 5, characterized in that the retaining means (12) comprises a retaining surface projecting essentially transversely to the center axis of the sealing plug (15) and facing away from the same.

7. The plug means as claimed in claim 6, characterized in that the retaining means (12) is provided with a sliding surface (24) chamfered essentially transversely to the center axis of the sealing plug (15) and facing the same.

8. The plug means as claimed in claim 7, characterized in that the sliding surface (24) has an angle of chamfer of roughly 30 to 60°, suitably roughly 45°.

9. The plug means as claimed in any one of claims 1 to 8, characterized in that the connecting element (14) consists of a steel cable.

10. The plug means as claimed in any one of claims 1-9, characterized in that the connecting element (14) is extended through the sealing plug (15) and connected to a level stick for measuring a fluid level.

Fig. 1

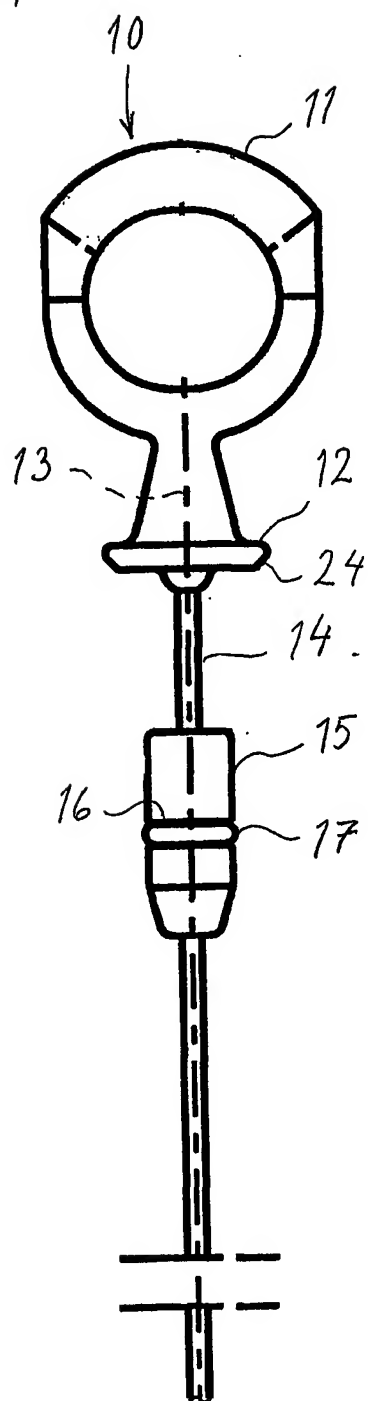
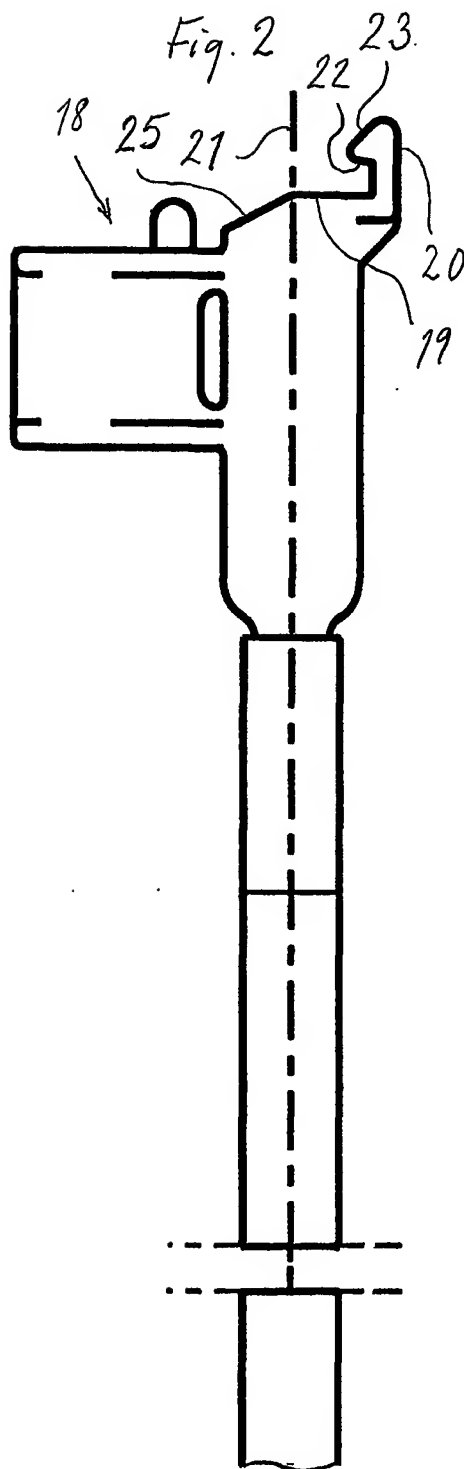
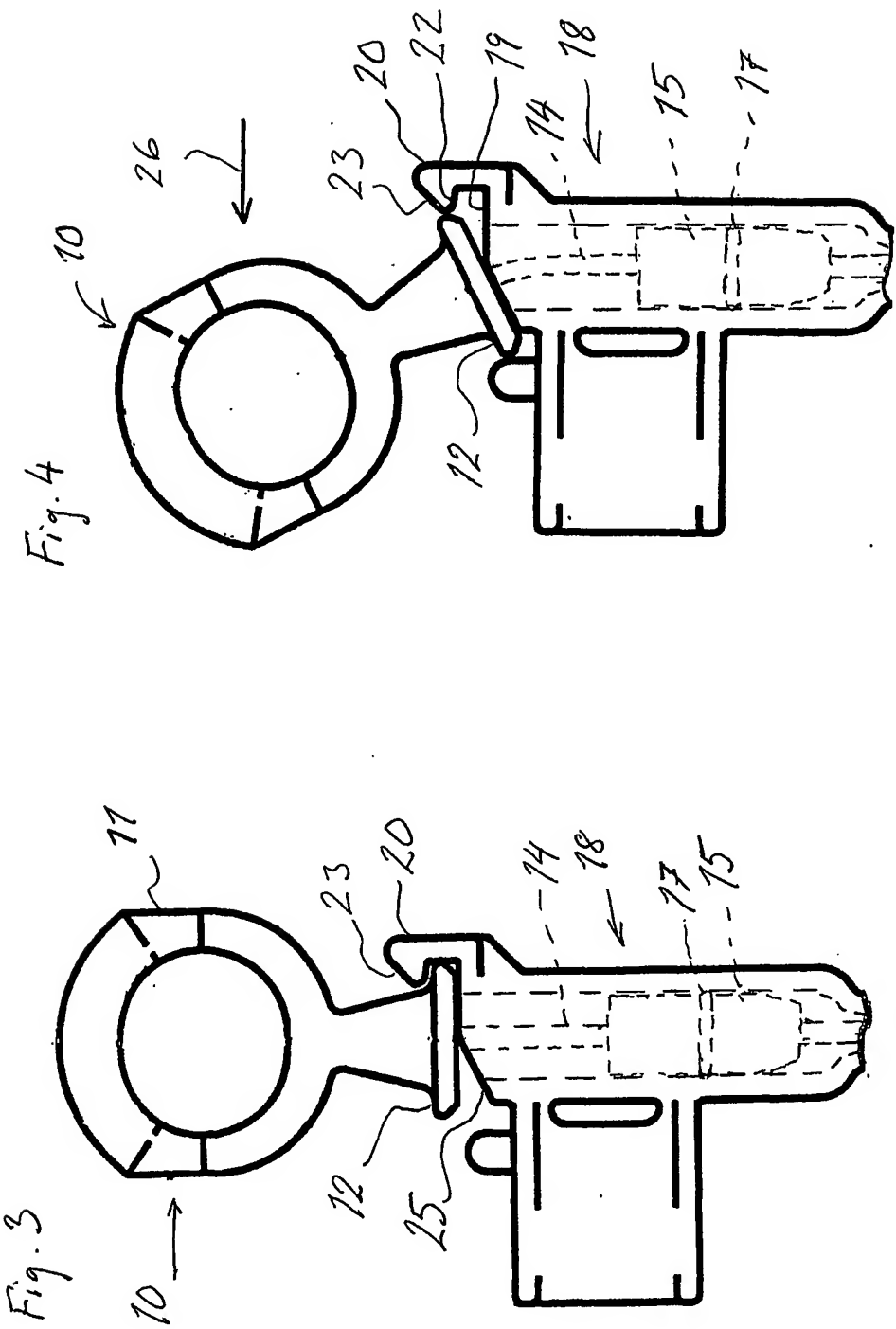


Fig. 2





INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F01M 11/12, G01F 23/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F01M, G01F, F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Patent Abstracts of Japan, abstract of JP 10-115211 A (AICHI MACH IND CO LTD), 6 May 1998 (06.05.98)	1
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A	US 5113594 A (Y. ISHIHARA ET AL), 19 May 1992 (19.05.92), figures 1-6	1
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Information on patent family members

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